

SEQUENCE LISTING

<110> Malvar, Thomas
Gilmer, Amy Jelen

<120> Antibodies Immunologically Reactive with Broad-Spectrum
Delta-Endotoxins (Amended)

<130> 11792.0210.DVUS03 (MECO:210--4)

<150> US 10/365,645

<151> 2003-02-12

<150> US 09/873,873

<151> 2001-06-04

<150> US 09/253,341

<151> 1999-02-19

<150> US 08/922,505

<151> 1997-09-03

<150> US 08/754,490

<151> 1996-11-20

<160> 35

<170> PatentIn version 3.2

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48

agt aac cct gaa gta gaa gta tta ggt gga gaa aga ata gaa act ggt
Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly
20 25 30

96

tac acc cca atc gat att tcc ttg tgc cta acg caa ttt ctt ttg agt
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
35 40 45

144

gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
50 55 60

192

tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
65 70 75 80

240

gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
85 90 95

288

att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
100 105 110

336

tct ttt aga gag tgg gaa gca gat cct act aat cca gca tta aga gaa
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
115 120 125

384

gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
130 135 140

432

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tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca	528
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser	
165 170 175	
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt	576
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg	
180 185 190	
tat aat gat tta act agg ctt att ggc aac tat aca gat tat gct gta	624
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val	
195 200 205	
cgc tgg tac aat acg gga tta gaa cgt gta tgg gga ccg gat tct aga	672
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg	
210 215 220	
gat tgg gta agg tat aat caa ttt aga aga gaa tta aca cta act gta	720
Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val	
225 230 235 240	
tta gat atc gtt gct ctg ttc ccg aat tat gat agt aga aga tat cca	768
Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro	
245 250 255	
att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta	816
Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val	
260 265 270	
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Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu	
275 280 285	
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Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr	
290 295 300	
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa	960
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln	
305 310 315 320	
ata atg gct tct cct gta ggg ttt tcg ggg cca gaa ttc act ttt ccg	1008
Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro	
325 330 335	
cta tat gga act atg gga aat gca gct cca caa caa cgt att gtt gct	1056
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala	
340 345 350	
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga	1104
Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg	
355 360 365	
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac	1152

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Gly	Thr	Glu	Phe	Ala	Tyr	Gly	Thr	Ser	Ser	Asn	Leu	Pro	Ser	Ala	Val		
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tac	aga	aaa	agc	gga	acg	gta	gat	tcg	ctg	gat	gaa	ata	ccg	cca	cag	1248	
Tyr	Arg	Lys	Ser	Gly	Thr	Val	Asp	Ser	Leu	Asp	Glu	Ile	Pro	Pro	Gln		
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aat	aac	aac	gtg	cca	cct	agg	caa	gga	ttt	agt	cat	cga	tta	agc	cat	1296	
Asn	Asn	Asn	Val	Pro	Pro	Arg	Gln	Gly	Phe	Ser	His	Arg	Leu	Ser	His		
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gtt	tca	atg	ttt	cgt	tca	ggc	ttt	agt	aat	agt	agt	gta	agt	ata	ata	1344	
Val	Ser	Met	Phe	Arg	Ser	Gly	Phe	Ser	Asn	Ser	Ser	Val	Ser	Ile	Ile		
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aga	gct	cca	atg	ttt	tct	tgg	acg	cac	cgt	agt	gca	acc	cct	aca	aat	1392	
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Thr	Ile	Asp	Pro	Glu	Arg	Ile	Thr	Gln	Ile	Pro	Leu	Val	Lys	Ala	His		
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Thr	Leu	Gln	Ser	Gly	Thr	Thr	Val	Val	Arg	Gly	Pro	Gly	Phe	Thr	Gly		
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gga	gat	att	ctt	cga	cga	aca	agt	gga	gga	cca	ttt	gct	tat	act	att	1536	
Gly	Asp	Ile	Leu	Arg	Arg	Thr	Ser	Gly	Gly	Pro	Phe	Ala	Tyr	Thr	Ile		
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gtt	aat	ata	aat	ggg	caa	tta	ccc	caa	agg	tat	cgt	gca	aga	ata	cgc	1584	
Val	Asn	Ile	Asn	Gly	Gln	Leu	Pro	Gln	Arg	Tyr	Arg	Ala	Arg	Ile	Arg		
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tat	gcc	tct	act	aca	aat	cta	aga	att	tac	gta	acg	gtt	gca	ggt	gaa	1632	
Tyr	Ala	Ser	Thr	Thr	Asn	Leu	Arg	Ile	Tyr	Val	Thr	Val	Ala	Gly	Glu		
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cgg	att	ttt	gct	ggt	caa	ttt	aac	aaa	aca	atg	gat	acc	ggt	gac	cca	1680	
Arg	Ile	Phe	Ala	Gly	Gln	Phe	Asn	Lys	Thr	Met	Asp	Thr	Gly	Asp	Pro		
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tta	aca	ttc	caa	tct	ttt	agt	tac	gca	act	att	aat	aca	gct	ttt	aca	1728	
Leu	Thr	Phe	Gln	Ser	Phe	Ser	Tyr	Ala	Thr	Ile	Asn	Thr	Ala	Phe	Thr		
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ttc	cca	atg	agc	cag	agt	agt	ttc	aca	gta	ggt	gct	gat	act	ttt	agt	1776	
Phe	Pro	Met	Ser	Gln	Ser	Ser	Phe	Thr	Val	Gly	Ala	Asp	Thr	Phe	Ser		
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Ser	Gly	Asn	Glu	Val	Tyr	Ile	Asp	Arg	Phe	Glu	Leu	Ile	Pro	Val	Thr		
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aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val 625 630 635 640	1920
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645 650 655	1968
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys 660 665 670	2016
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675 680 685	2064
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr 690 695 700	2112
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aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735	2208
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750	2256
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765	2304
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780	2352
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800	2400
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Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile	
835 840 845	
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag	2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu	
850 855 860	
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa	2640
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys	
865 870 875 880	
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa	2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu	
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Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe	
900 905 910	
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg	2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met	
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att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg	2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu	
930 935 940	
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Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu	
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Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val	
980 985 990	
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt	3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu	
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Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val	
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Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu	
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Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn	
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Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys	
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tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga	3384
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Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys	
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1145 1150 1155	
gga gaa acg gaa gga aca ttt atc gtg gac agc gtg gaa tta ctc	3519
Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu	
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Leu Met Glu Glu	
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Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser	
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Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile	
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Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile	
65 70 75 80	

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Tyr	Asn	Asp	Leu	Thr	Arg	Leu	Ile	Gly	Asn	Tyr	Thr	Asp	Tyr	Ala	Val	
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					370		375				380					

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val
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 Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln
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 Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile
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 Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu
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 Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro
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 Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr
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 Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val
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 Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val
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 Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser
 645 650 655
 Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys
 660 665 670
 His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn
 675 680 685
 Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr

690	695	700
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Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735		
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750		
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765		
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780		
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800		
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815		
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830		
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile 835 840 845		
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Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys 865 870 875 880		
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu 885 890 895		
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe 900 905 910		
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met 915 920 925		
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu 930 935 940		
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu 945 950 955 960		
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn 965 970 975		
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val 980 985 990		
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu 995 1000 1005		

Val	Val	Pro	Glu	Trp	Glu	Ala	Glu	Val	Ser	Gln	Glu	Val	Arg	Val
1010						1015					1020			
Cys	Pro	Gly	Arg	Gly	Tyr	Ile	Leu	Arg	Val	Thr	Ala	Tyr	Lys	Glu
1025						1030					1035			
Gly	Tyr	Gly	Glu	Gly	Cys	Val	Thr	Ile	His	Glu	Ile	Glu	Asn	Asn
1040						1045					1050			
Thr	Asp	Glu	Leu	Lys	Phe	Ser	Asn	Cys	Val	Glu	Glu	Glu	Ile	Tyr
1055						1060					1065			
Pro	Asn	Asn	Thr	Val	Thr	Cys	Asn	Asp	Tyr	Thr	Val	Asn	Gln	Glu
1070						1075					1080			
Glu	Tyr	Gly	Gly	Ala	Tyr	Thr	Ser	Arg	Asn	Arg	Gly	Tyr	Asn	Glu
1085						1090					1095			
Ala	Pro	Ser	Val	Pro	Ala	Asp	Tyr	Ala	Ser	Val	Tyr	Glu	Glu	Lys
1100						1105					1110			
Ser	Tyr	Thr	Asp	Gly	Arg	Arg	Glu	Asn	Pro	Cys	Glu	Phe	Asn	Arg
1115						1120					1125			
Gly	Tyr	Arg	Asp	Tyr	Thr	Pro	Leu	Pro	Val	Gly	Tyr	Val	Thr	Lys
1130						1135					1140			
Glu	Leu	Glu	Tyr	Phe	Pro	Glu	Thr	Asp	Lys	Val	Trp	Ile	Glu	Ile
1145						1150					1155			
Gly	Glu	Thr	Glu	Gly	Thr	Phe	Ile	Val	Asp	Ser	Val	Glu	Leu	Leu
1160						1165					1170			
Leu	Met	Glu	Glu											
1175														

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 <212> DNA
 <213> Artificial

<220>
 <223> Hybrid Delta-Endotoxin

<220>
 <221> CDS
 <222> (1)..(3531)

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Met	Asp	Asn	Asn	Pro	Asn	Ile	Asn	Glu	Cys	Ile	Pro	Tyr	Asn	Cys	Leu
1				5				10					15		
agt	aac	cct	gaa	gta	gaa	gta	tta	ggg	gga	gaa	aga	ata	gaa	act	ggg
Ser	Asn	Pro	Glu	Val	Glu	Val	Leu	Gly	Gly	Glu	Arg	Ile	Glu	Thr	Gly

48

96

20	25	30	
tac acc cca atc gat att tcc ttg tgc cta acg caa ttt ctt ttg agt			144
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser			
35	40	45	
gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata			192
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile			
50	55	60	
tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att			240
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile			
65	70	75	80
gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc			288
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala			
85	90	95	
att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa			336
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu			
100	105	110	
tct ttt aga gag tgg gaa gca gat cct act aat cca gca tta aga gaa			384
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu			
115	120	125	
gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct			432
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala			
130	135	140	
att cct ctt ttt gca gtt caa aat tat caa gtt cct ctt tta tca gta			480
Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val			
145	150	155	160
tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca			528
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser			
165	170	175	
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt			576
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg			
180	185	190	
tat aat gat tta act agg ctt att ggc aac tat aca gat tat gct gta			624
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val			
195	200	205	
cgc tgg tac aat acg gga tta gaa cgt gta tgg gga ccg gat tct aga			672
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg			
210	215	220	
gat tgg gta agg tat aat caa ttt aga aga gaa tta aca cta act gta			720
Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val			
225	230	235	240
tta gat atc gtt gct ctg ttc ccg aat tat gat agt aga aga tat cca			768
Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro			
245	250	255	

att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tcg gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
ata atg gct tct cct gta ggg ttt tcg ggg cca gaa ttc act ttt ccg Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335	1008
cta tat gga act atg gga aat gca gct cca caa caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365	1104
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp 370 375 380	1152
ggg aca gaa ttt gct tat gga acc tcc tca aat ttg cca tcc gct gta Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val 385 390 395 400	1200
tac aga aaa agc gga acg gta gat tcg ctg gat gaa ata ccg cca cag Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln 405 410 415	1248
aat aac aac gtg cca cct agg caa gga ttt agt cat cga tta agc cat Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His 420 425 430	1296
gtt tca atg ttt cgt tca ggc ttt agt aat agt agt gta agt ata ata Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile 435 440 445	1344
aga gct cca atg ttt tct tgg acg cac cgt agt gca acc cct aca aat Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn 450 455 460	1392
aca att gat ccg gag agg att act caa ata cca ttg gta aaa gca cat Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His 465 470 475 480	1440
aca ctt cag tca ggt act act gtt gta aga ggg ccc ggg ttt acg gga Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly	1488

485										490					495					
gga gat att ctt cga cga aca agt	gga gga cca ttt gct tat act att	1536																		
Gly Asp Ile Leu Arg Arg Thr Ser	Gly Gly Pro Phe Ala Tyr Thr Ile																			
500	505 510																			
ggt aat ata aat ggg caa tta ccc caa agg tat cgt gca aga ata cgc	1584																			
Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg																				
515	520 525																			
tat gcc tct act aca aat cta aga att tac gta acg gtt gca ggt gaa	1632																			
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu																				
530	535 540																			
cgg att ttt gct ggt caa ttt aac aaa aca atg gat acc ggt gac cca	1680																			
Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro																				
545	550 555 560																			
tta aca ttc caa tct ttt agt tac gca act att aat aca gct ttt aca	1728																			
Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr																				
565	570 575																			
ttc cca atg agc cag agt agt ttc aca gta ggt gct gat act ttt agt	1776																			
Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser																				
580	585 590																			
tca ggg aat gaa gtt tat ata gac aga ttt gaa ttg att cca gtt act	1824																			
Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr																				
595	600 605																			
gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg	1872																			
Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val																				
610	615 620																			
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg	1920																			
Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val																				
625	630 635 640																			
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca	1968																			
Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser																				
645	650 655																			
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa	2016																			
Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys																				
660	665 670																			
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac	2064																			
His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn																				
675	680 685																			
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg	2112																			
Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr																				
690	695 700																			
gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc	2160																			
Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val																				
705	710 715 720																			

aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa	2208
Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln	
725 730 735	
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga	2256
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg	
740 745 750	
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac	2304
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr	
755 760 765	
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg	2352
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp	
770 775 780	
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga	2400
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg	
785 790 795 800	
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg	2448
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg	
805 810 815	
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att	2496
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile	
820 825 830	
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc	2544
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile	
835 840 845	
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag	2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu	
850 855 860	
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa	2640
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys	
865 870 875 880	
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa	2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu	
885 890 895	
aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt	2736
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe	
900 905 910	
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg	2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met	
915 920 925	
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg	2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu	
930 935 940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa	2880
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu	

945	950	955	960	
tta gaa ggg cgt att ttc act gca ttc tcc cta tat gat gcg aga aat				2928
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn				
	965	970	975	
gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg				2976
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val				
	980	985	990	
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt				3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu				
	995	1000	1005	
gtt gtt ccg gaa tgg gaa gca gaa gtg tca caa gaa gtt cgt gtc				3069
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val				
	1010	1015	1020	
tgt ccg ggt cgt ggc tat atc ctt cgt gtc aca gcg tac aag gag				3114
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu				
	1025	1030	1035	
gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat				3159
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn				
	1040	1045	1050	
aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat				3204
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr				
	1055	1060	1065	
cca aat aac acg gta acg tgt aat gat tat act gta aat caa gaa				3249
Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu				
	1070	1075	1080	
gaa tac gga ggt gcg tac act tct cgt aat cga gga tat aac gaa				3294
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu				
	1085	1090	1095	
gct cct tcc gta cca gct gat tat gcg tca gtc tat gaa gaa aaa				3339
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys				
	1100	1105	1110	
tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga				3384
Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg				
	1115	1120	1125	
ggg tat agg gat tac acg cca cta cca gtt ggt tat gtg aca aaa				3429
Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys				
	1130	1135	1140	
gaa tta gaa tac ttc cca gaa acc gat aag gta tgg att gag att				3474
Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile				
	1145	1150	1155	
gga gaa acg gaa gga aca ttt atc gtg gac agc gtg gaa tta ctc				3519
Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu				
	1160	1165	1170	

ctt atg gag gaa
 Leu Met Glu Glu
 1175

3531

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 <211> 1177
 <212> PRT
 <213> Artificial

<220>
 <223> Hybrid Delta-Endotoxin

<400> 12

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Ser	Asn	Pro	Glu	Val	Glu	Val	Leu	Gly	Gly	Glu	Arg	Ile	Glu	Thr	Gly
			20					25					30		
Tyr	Thr	Pro	Ile	Asp	Ile	Ser	Leu	Ser	Leu	Thr	Gln	Phe	Leu	Leu	Ser
		35					40					45			
Glu	Phe	Val	Pro	Gly	Ala	Gly	Phe	Val	Leu	Gly	Leu	Val	Asp	Ile	Ile
	50					55					60				
Trp	Gly	Ile	Phe	Gly	Pro	Ser	Gln	Trp	Asp	Ala	Phe	Leu	Val	Gln	Ile
65					70				75					80	
Glu	Gln	Leu	Ile	Asn	Gln	Arg	Ile	Glu	Glu	Phe	Ala	Arg	Asn	Gln	Ala
				85					90					95	
Ile	Ser	Arg	Leu	Glu	Gly	Leu	Ser	Asn	Leu	Tyr	Gln	Ile	Tyr	Ala	Glu
			100					105					110		
Ser	Phe	Arg	Glu	Trp	Glu	Ala	Asp	Pro	Thr	Asn	Pro	Ala	Leu	Arg	Glu
		115					120					125			
Glu	Met	Arg	Ile	Gln	Phe	Asn	Asp	Met	Asn	Ser	Ala	Leu	Thr	Thr	Ala
	130					135					140				
Ile	Pro	Leu	Phe	Ala	Val	Gln	Asn	Tyr	Gln	Val	Pro	Leu	Leu	Ser	Val
145					150					155				160	
Tyr	Val	Gln	Ala	Ala	Asn	Leu	His	Leu	Ser	Val	Leu	Arg	Asp	Val	Ser
			165						170					175	
Val	Phe	Gly	Gln	Arg	Trp	Gly	Phe	Asp	Ala	Ala	Thr	Ile	Asn	Ser	Arg
			180					185					190		
Tyr	Asn	Asp	Leu	Thr	Arg	Leu	Ile	Gly	Asn	Tyr	Thr	Asp	Tyr	Ala	Val
		195					200					205			
Arg	Trp	Tyr	Asn	Thr	Gly	Leu	Glu	Arg	Val	Trp	Gly	Pro	Asp	Ser	Arg
	210					215					220				
Asp	Trp	Val	Arg	Tyr	Asn	Gln	Phe	Arg	Arg	Glu	Leu	Thr	Leu	Thr	Val

225		230		235		240
Leu Asp Ile Val	Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro					
	245			250		255
Ile Arg Thr Val	Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val					
	260			265		270
Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu						
	275			280		285
Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr						
	290			295		300
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln						
	305			310		315
Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro						
	325			330		335
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala						
	340			345		350
Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg						
	355			360		365
Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp						
	370			375		380
Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val						
	385			390		395
Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln						
	405			410		415
Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His						
	420			425		430
Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile						
	435			440		445
Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn						
	450			455		460
Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His						
	465			470		475
Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly						
	485			490		495
Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile						
	500			505		510
Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg						
	515			520		525
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu						
	530			535		540

Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro
 545 550 555 560
 Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr
 565 570 575
 Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser
 580 585 590
 Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr
 595 600 605
 Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val
 610 615 620
 Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val
 625 630 635 640
 Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser
 645 650 655
 Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys
 660 665 670
 His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn
 675 680 685
 Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr
 690 695 700
 Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val
 705 710 715 720
 Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln
 725 730 735
 Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg
 740 745 750
 Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr
 755 760 765
 Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp
 770 775 780
 Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg
 785 790 795 800
 Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg
 805 810 815
 Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile
 820 825 830
 Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile
 835 840 845

Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu
850 855 860
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys
865 870 875 880
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu
885 890 895
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe
900 905 910
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met
915 920 925
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu
930 935 940
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu
945 950 955 960
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn
965 970 975
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val
980 985 990
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu
995 1000 1005
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val
1010 1015 1020
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu
1025 1030 1035
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn
1040 1045 1050
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr
1055 1060 1065
Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu
1070 1075 1080
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu
1085 1090 1095
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys
1100 1105 1110
Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg
1115 1120 1125
Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys
1130 1135 1140
Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile

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 Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu Leu
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 Leu Met Glu Glu
 1175

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<220>
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 agt aac cct gaa gta gaa gta tta ggt gga gaa aga ata gaa act ggt 96
 Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly
 20 25 30
 tac acc cca atc gat att tcc ttg tcg cta acg caa ttt ctt ttg agt 144
 Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
 35 40 45
 gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata 192
 Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
 50 55 60
 tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att 240
 Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
 65 70 75 80
 gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc 288
 Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
 85 90 95
 att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa 336
 Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
 100 105 110
 tct ttt aga gag tgg gaa gca gat cct act aat cca gca tta aga gaa 384
 Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
 115 120 125
 gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct 432
 Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
 130 135 140

att cct ctt ttt gca gtt caa aat tat caa gtt cct ctt tta tca gta Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val 145 150 155 160	480
tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser 165 170 175	528
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg 180 185 190	576
tat aat gat tta act agg ctt att ggc aac tat aca gat tat gct gta Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val 195 200 205	624
cgc tgg tac aat acg gga tta gaa cgt gta tgg gga ccg gat tct aga Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg 210 215 220	672
gat tgg gta agg tat aat caa ttt aga aga gaa tta aca cta act gta Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val 225 230 235 240	720
tta gat atc gtt gct ctg ttc ccg aat tat gat agt aga aga tat cca Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro 245 250 255	768
att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tcg gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
ata atg gct tct cct gta ggg ttt tcg ggg cca gaa ttc act ttt ccg Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335	1008
cta tat gga act atg gga aat gca gct cca caa caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tcg tcc act tta tat aga Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365	1104
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac	1152

Arg	Pro	Phe	Asn	Ile	Gly	Ile	Asn	Asn	Gln	Gln	Leu	Ser	Val	Leu	Asp		
370						375					380						
ggg	aca	gaa	ttt	gct	tat	gga	acc	tcc	tca	aat	ttg	cca	tcc	gct	gta	1200	
Gly	Thr	Glu	Phe	Ala	Tyr	Gly	Thr	Ser	Ser	Asn	Leu	Pro	Ser	Ala	Val		
385				390					395					400			
tac	aga	aaa	agc	gga	acg	gta	gat	tcg	ctg	gat	gaa	ata	ccg	cca	cag	1248	
Tyr	Arg	Lys	Ser	Gly	Thr	Val	Asp	Ser	Leu	Asp	Glu	Ile	Pro	Pro	Gln		
			405					410					415				
aat	aac	aac	gtg	cca	cct	agg	caa	gga	ttt	agt	cat	cga	tta	agc	cat	1296	
Asn	Asn	Asn	Val	Pro	Pro	Arg	Gln	Gly	Phe	Ser	His	Arg	Leu	Ser	His		
		420					425					430					
gtt	tca	atg	ttt	cgt	tca	ggc	ttt	agt	aat	agt	agt	gta	agt	ata	ata	1344	
Val	Ser	Met	Phe	Arg	Ser	Gly	Phe	Ser	Asn	Ser	Ser	Val	Ser	Ile	Ile		
	435					440						445					
aga	gct	cca	atg	ttt	tct	tgg	acg	cac	cgt	agt	gca	acc	cct	aca	aat	1392	
Arg	Ala	Pro	Met	Phe	Ser	Trp	Thr	His	Arg	Ser	Ala	Thr	Pro	Thr	Asn		
	450					455					460						
aca	att	gat	ccg	gag	agg	att	act	caa	ata	cca	ttg	gta	aaa	gca	cat	1440	
Thr	Ile	Asp	Pro	Glu	Arg	Ile	Thr	Gln	Ile	Pro	Leu	Val	Lys	Ala	His		
465				470					475					480			
aca	ctt	cag	tca	ggt	act	act	gtt	gta	aga	ggg	ccc	ggg	ttt	acg	gga	1488	
Thr	Leu	Gln	Ser	Gly	Thr	Thr	Val	Val	Arg	Gly	Pro	Gly	Phe	Thr	Gly		
			485					490					495				
gga	gat	att	ctt	cga	cga	aca	agt	gga	gga	cca	ttt	gct	tat	act	att	1536	
Gly	Asp	Ile	Leu	Arg	Arg	Thr	Ser	Gly	Gly	Pro	Phe	Ala	Tyr	Thr	Ile		
		500					505					510					
gtt	aat	ata	aat	ggg	caa	tta	ccc	caa	agg	tat	cgt	gca	aga	ata	cgc	1584	
Val	Asn	Ile	Asn	Gly	Gln	Leu	Pro	Gln	Arg	Tyr	Arg	Ala	Arg	Ile	Arg		
	515					520						525					
tat	gcc	tct	act	aca	aat	cta	aga	att	tac	gta	acg	gtt	gca	ggt	gaa	1632	
Tyr	Ala	Ser	Thr	Thr	Asn	Leu	Arg	Ile	Tyr	Val	Thr	Val	Ala	Gly	Glu		
	530					535				540							
cgg	att	ttt	gct	ggt	caa	ttt	aac	aaa	aca	atg	gat	acc	ggt	gac	cca	1680	
Arg	Ile	Phe	Ala	Gly	Gln	Phe	Asn	Lys	Thr	Met	Asp	Thr	Gly	Asp	Pro		
545				550					555					560			
tta	aca	ttc	caa	tct	ttt	agt	tac	gca	act	att	aat	aca	gct	ttt	aca	1728	
Leu	Thr	Phe	Gln	Ser	Phe	Ser	Tyr	Ala	Thr	Ile	Asn	Thr	Ala	Phe	Thr		
			565					570					575				
ttc	cca	atg	agc	cag	agt	agt	ttc	aca	gta	ggt	gct	gat	act	ttt	agt	1776	
Phe	Pro	Met	Ser	Gln	Ser	Ser	Phe	Thr	Val	Gly	Ala	Asp	Thr	Phe	Ser		
		580					585					590					
tca	ggg	aat	gaa	gtt	tat	ata	gac	aga	ttt	gaa	ttg	att	cca	gtt	act	1824	
Ser	Gly	Asn	Glu	Val	Tyr	Ile	Asp	Arg	Phe	Glu	Leu	Ile	Pro	Val	Thr		
	595					600						605					

gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val 610 615 620	1872
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val 625 630 635 640	1920
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645 650 655	1968
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys 660 665 670	2016
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675 680 685	2064
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr 690 695 700	2112
gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705 710 715 720	2160
aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735	2208
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750	2256
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765	2304
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780	2352
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800	2400
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815	2448
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830	2496
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc	2544

Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile	
835 840 845	
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag	2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu	
850 855 860	
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa	2640
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys	
865 870 875 880	
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa	2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu	
885 890 895	
aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt	2736
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe	
900 905 910	
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg	2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met	
915 920 925	
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg	2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu	
930 935 940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa	2880
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu	
945 950 955 960	
tta gaa ggg cgt att ttc act gca ttc tcc cta tat gat gcg aga aat	2928
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn	
965 970 975	
gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg	2976
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val	
980 985 990	
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt	3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu	
995 1000 1005	
gtt gtt ccg gaa tgg gaa gca gaa gtg tca caa gaa gtt cgt gtc	3069
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val	
1010 1015 1020	
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Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu	
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gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat	3159
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn	
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aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat	3204
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr	
1055 1060 1065	

cca aat aac acg gta acg tgt	aat gat tat act gta aat caa gaa	3249
Pro Asn Asn Thr Val Thr Cys	Asn Asp Tyr Thr Val Asn Gln Glu	
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Glu Tyr Gly Gly Ala Tyr Thr	Ser Arg Asn Arg Gly Tyr Asn Glu	
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Ala Pro Ser Val Pro Ala Asp	Tyr Ala Ser Val Tyr Glu Glu Lys	
1100	1105 1110	
tcg tat aca gat gga cga aga	gag aat cct tgt gaa ttt aac aga	3384
Ser Tyr Thr Asp Gly Arg Arg	Glu Asn Pro Cys Glu Phe Asn Arg	
1115	1120 1125	
ggg tat agg gat tac acg cca	cta cca gtt ggt tat gtg aca aaa	3429
Gly Tyr Arg Asp Tyr Thr Pro	Leu Pro Val Gly Tyr Val Thr Lys	
1130	1135 1140	
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Glu Leu Glu Tyr Phe Pro Glu	Thr Asp Lys Val Trp Ile Glu Ile	
1145	1150 1155	
gga gaa acg gaa gga aca ttt	atc gtg gac agc gtg gaa tta ctc	3519
Gly Glu Thr Glu Gly Thr Phe	Ile Val Asp Ser Val Glu Leu Leu	
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Leu Met Glu Glu		
1175		

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Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser	
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Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile	
50 55 60	
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile	
65 70 75 80	

Glu	Gln	Leu	Ile	Asn	Gln	Arg	Ile	Glu	Glu	Phe	Ala	Arg	Asn	Gln	Ala	
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Ile	Ser	Arg	Leu	Glu	Gly	Leu	Ser	Asn	Leu	Tyr	Gln	Ile	Tyr	Ala	Glu	
			100					105					110			
Ser	Phe	Arg	Glu	Trp	Glu	Ala	Asp	Pro	Thr	Asn	Pro	Ala	Leu	Arg	Glu	
		115					120					125				
Glu	Met	Arg	Ile	Gln	Phe	Asn	Asp	Met	Asn	Ser	Ala	Leu	Thr	Thr	Ala	
	130					135					140					
Ile	Pro	Leu	Phe	Ala	Val	Gln	Asn	Tyr	Gln	Val	Pro	Leu	Leu	Ser	Val	
145					150					155					160	
Tyr	Val	Gln	Ala	Ala	Asn	Leu	His	Leu	Ser	Val	Leu	Arg	Asp	Val	Ser	
			165					170						175		
Val	Phe	Gly	Gln	Arg	Trp	Gly	Phe	Asp	Ala	Ala	Thr	Ile	Asn	Ser	Arg	
		180						185					190			
Tyr	Asn	Asp	Leu	Thr	Arg	Leu	Ile	Gly	Asn	Tyr	Thr	Asp	Tyr	Ala	Val	
	195						200					205				
Arg	Trp	Tyr	Asn	Thr	Gly	Leu	Glu	Arg	Val	Trp	Gly	Pro	Asp	Ser	Arg	
	210					215					220					
Asp	Trp	Val	Arg	Tyr	Asn	Gln	Phe	Arg	Arg	Glu	Leu	Thr	Leu	Thr	Val	
225					230					235					240	
Leu	Asp	Ile	Val	Ala	Leu	Phe	Pro	Asn	Tyr	Asp	Ser	Arg	Arg	Tyr	Pro	
			245						250					255		
Ile	Arg	Thr	Val	Ser	Gln	Leu	Thr	Arg	Glu	Ile	Tyr	Thr	Asn	Pro	Val	
		260						265					270			
Leu	Glu	Asn	Phe	Asp	Gly	Ser	Phe	Arg	Gly	Ser	Ala	Gln	Gly	Ile	Glu	
	275						280					285				
Arg	Ser	Ile	Arg	Ser	Pro	His	Leu	Met	Asp	Ile	Leu	Asn	Ser	Ile	Thr	
	290					295					300					
Ile	Tyr	Thr	Asp	Ala	His	Arg	Gly	Tyr	Tyr	Tyr	Trp	Ser	Gly	His	Gln	
305					310					315					320	
Ile	Met	Ala	Ser	Pro	Val	Gly	Phe	Ser	Gly	Pro	Glu	Phe	Thr	Phe	Pro	
			325						330					335		
Leu	Tyr	Gly	Thr	Met	Gly	Asn	Ala	Ala	Pro	Gln	Gln	Arg	Ile	Val	Ala	
		340						345					350			
Gln	Leu	Gly	Gln	Gly	Val	Tyr	Arg	Thr	Leu	Ser	Ser	Thr	Leu	Tyr	Arg	
	355						360					365				
Arg	Pro	Phe	Asn	Ile	Gly	Ile	Asn	Asn	Gln	Gln	Leu	Ser	Val	Leu	Asp	
	370					375					380					

Gly	Thr	Glu	Phe	Ala	Tyr	Gly	Thr	Ser	Ser	Asn	Leu	Pro	Ser	Ala	Val	385	390	395	400
Tyr	Arg	Lys	Ser	Gly	Thr	Val	Asp	Ser	Leu	Asp	Glu	Ile	Pro	Pro	Gln	405	410	415	
Asn	Asn	Asn	Val	Pro	Pro	Arg	Gln	Gly	Phe	Ser	His	Arg	Leu	Ser	His	420	425	430	
Val	Ser	Met	Phe	Arg	Ser	Gly	Phe	Ser	Asn	Ser	Ser	Val	Ser	Ile	Ile	435	440	445	
Arg	Ala	Pro	Met	Phe	Ser	Trp	Thr	His	Arg	Ser	Ala	Thr	Pro	Thr	Asn	450	455	460	
Thr	Ile	Asp	Pro	Glu	Arg	Ile	Thr	Gln	Ile	Pro	Leu	Val	Lys	Ala	His	465	470	475	480
Thr	Leu	Gln	Ser	Gly	Thr	Thr	Val	Val	Arg	Gly	Pro	Gly	Phe	Thr	Gly	485	490	495	
Gly	Asp	Ile	Leu	Arg	Arg	Thr	Ser	Gly	Gly	Pro	Phe	Ala	Tyr	Thr	Ile	500	505	510	
Val	Asn	Ile	Asn	Gly	Gln	Leu	Pro	Gln	Arg	Tyr	Arg	Ala	Arg	Ile	Arg	515	520	525	
Tyr	Ala	Ser	Thr	Thr	Asn	Leu	Arg	Ile	Tyr	Val	Thr	Val	Ala	Gly	Glu	530	535	540	
Arg	Ile	Phe	Ala	Gly	Gln	Phe	Asn	Lys	Thr	Met	Asp	Thr	Gly	Asp	Pro	545	550	555	560
Leu	Thr	Phe	Gln	Ser	Phe	Ser	Tyr	Ala	Thr	Ile	Asn	Thr	Ala	Phe	Thr	565	570	575	
Phe	Pro	Met	Ser	Gln	Ser	Ser	Phe	Thr	Val	Gly	Ala	Asp	Thr	Phe	Ser	580	585	590	
Ser	Gly	Asn	Glu	Val	Tyr	Ile	Asp	Arg	Phe	Glu	Leu	Ile	Pro	Val	Thr	595	600	605	
Ala	Thr	Phe	Glu	Ala	Glu	Tyr	Asp	Leu	Glu	Arg	Ala	Gln	Lys	Ala	Val	610	615	620	
Asn	Ala	Leu	Phe	Thr	Ser	Ile	Asn	Gln	Ile	Gly	Ile	Lys	Thr	Asp	Val	625	630	635	640
Thr	Asp	Tyr	His	Ile	Asp	Gln	Val	Ser	Asn	Leu	Val	Asp	Cys	Leu	Ser	645	650	655	
Asp	Glu	Phe	Cys	Leu	Asp	Glu	Lys	Arg	Glu	Leu	Ser	Glu	Lys	Val	Lys	660	665	670	
His	Ala	Lys	Arg	Leu	Ser	Asp	Glu	Arg	Asn	Leu	Leu	Gln	Asp	Pro	Asn	675	680	685	
Phe	Lys	Gly	Ile	Asn	Arg	Gln	Leu	Asp	Arg	Gly	Trp	Arg	Gly	Ser	Thr				

690	695	700
Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705 710 715 720		
Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln 725 730 735		
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg 740 745 750		
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr 755 760 765		
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp 770 775 780		
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800		
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815		
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830		
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile 835 840 845		
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu 850 855 860		
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys 865 870 875 880		
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu 885 890 895		
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe 900 905 910		
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met 915 920 925		
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu 930 935 940		
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu 945 950 955 960		
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn 965 970 975		
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val 980 985 990		
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu 995 1000 1005		

Val	Val	Pro	Glu	Trp	Glu	Ala	Glu	Val	Ser	Gln	Glu	Val	Arg	Val
1010						1015					1020			
Cys	Pro	Gly	Arg	Gly	Tyr	Ile	Leu	Arg	Val	Thr	Ala	Tyr	Lys	Glu
1025						1030					1035			
Gly	Tyr	Gly	Glu	Gly	Cys	Val	Thr	Ile	His	Glu	Ile	Glu	Asn	Asn
1040						1045					1050			
Thr	Asp	Glu	Leu	Lys	Phe	Ser	Asn	Cys	Val	Glu	Glu	Glu	Ile	Tyr
1055						1060					1065			
Pro	Asn	Asn	Thr	Val	Thr	Cys	Asn	Asp	Tyr	Thr	Val	Asn	Gln	Glu
1070						1075					1080			
Glu	Tyr	Gly	Gly	Ala	Tyr	Thr	Ser	Arg	Asn	Arg	Gly	Tyr	Asn	Glu
1085						1090					1095			
Ala	Pro	Ser	Val	Pro	Ala	Asp	Tyr	Ala	Ser	Val	Tyr	Glu	Glu	Lys
1100						1105					1110			
Ser	Tyr	Thr	Asp	Gly	Arg	Arg	Glu	Asn	Pro	Cys	Glu	Phe	Asn	Arg
1115						1120					1125			
Gly	Tyr	Arg	Asp	Tyr	Thr	Pro	Leu	Pro	Val	Gly	Tyr	Val	Thr	Lys
1130						1135					1140			
Glu	Leu	Glu	Tyr	Phe	Pro	Glu	Thr	Asp	Lys	Val	Trp	Ile	Glu	Ile
1145						1150					1155			
Gly	Glu	Thr	Glu	Gly	Thr	Phe	Ile	Val	Asp	Ser	Val	Glu	Leu	Leu
1160						1165					1170			
Leu	Met	Glu	Glu											
1175														

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20

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atttgagtaa tactatcc 18

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<220>
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<400> 24
attactcaaa taccattgg 19

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agt aac cct gaa gta gaa gta tta ggt gga gaa aga ata gaa act ggt				96
Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly				
	20	25	30	
tac acc cca atc gat att tcc ttg tgc cta acg caa ttt ctt ttg agt				144
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser				
	35	40	45	
gaa ttt gtt ccc ggt gct gga ttt gtg tta gga cta gtt gat ata ata				192
Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile				
	50	55	60	
tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att				240
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile				
	65	70	75	80
gaa cag tta att aac caa aga ata gaa gaa ttc gct agg aac caa gcc				288
Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala				
	85	90	95	
att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa				336
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu				
	100	105	110	
tct ttt aga gag tgg gaa gca gat cct act aat cca gca tta aga gaa				384
Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu				
	115	120	125	
gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct				432
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala				
	130	135	140	
att cct ctt ttt gca gtt caa aat tat caa gtt cct ctt tta tca gta				480
Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val				
	145	150	155	160
tat gtt caa gct gca aat tta cat tta tca gtt ttg aga gat gtt tca				528
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser				
	165	170	175	
gtg ttt gga caa agg tgg gga ttt gat gcc gcg act atc aat agt cgt				576
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg				
	180	185	190	
tat aat gat tta act agg ctt att ggc aac tat aca gat cat gct gta				624
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp His Ala Val				
	195	200	205	
cgc tgg tac aat acg gga tta gag cgt gta tgg gga ccg gat tct aga				672
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg				
	210	215	220	
gat tgg ata aga tat aat caa ttt aga aga gaa tta aca cta act gta				720
Asp Trp Ile Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val				
	225	230	235	240

tta gat atc gtt tct cta ttt ccg aac tat gat agt aga acg tat cca Leu Asp Ile Val Ser Leu Phe Pro Asn Tyr Asp Ser Arg Thr Tyr Pro 245 250 255	768
att cga aca gtt tcc caa tta aca aga gaa att tat aca aac cca gta Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270	816
tta gaa aat ttt gat ggt agt ttt cga ggc tgc gct cag ggc ata gaa Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285	864
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300	912
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315 320	960
ata atg gct tct cct gta ggg ttt tgc ggg cca gaa ttc act ttt ccg Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335	1008
cta tat gga act atg gga aat gca gct cca caa caa cgt att gtt gct Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350	1056
caa cta ggt cag ggc gtg tat aga aca tta tgc tcc act tta tat aga Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365	1104
aga cct ttt aat ata ggg ata aat aat caa caa cta tct gtt ctt gac Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp 370 375 380	1152
ggg aca gaa ttt gct tat gga acc tcc tca aat ttg cca tcc gct gta Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val 385 390 395 400	1200
tac aga aaa agc gga acg gta gat tgc ctg gat gaa ata ccg cca cag Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln 405 410 415	1248
aat aac aac gtg cca cct agg caa gga ttt agt cat cga tta agc cat Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His 420 425 430	1296
gtt tca atg ttt cgt tca ggc ttt agt aat agt agt gta agt ata ata Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile 435 440 445	1344
aga gct cca atg ttt tct tgg acg cac cgt agt gca acc cct aca aat Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn 450 455 460	1392
aca att gat ccg gag agg att act caa ata cca ttg gta aaa gca cat Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His	1440

465	470	475	480	
aca ctt cag tca ggt act act gtt gta aga ggg ccc ggg ttt acg gga				1488
Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly	485	490	495	
gga gat att ctt cga cga aca agt gga gga cca ttt gct tat act att				1536
Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile	500	505	510	
gtt aat ata aat ggg caa tta ccc caa agg tat cgt gca aga ata cgc				1584
Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg	515	520	525	
tat gcc tct act aca aat cta aga att tac gta acg gtt gca ggt gaa				1632
Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu	530	535	540	
cgg att ttt gct ggt caa ttt aac aaa aca atg gat acc ggt gac cca				1680
Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro	545	550	555	560
tta aca ttc caa tct ttt agt tac gca act att aat acagct ttt aca				1728
Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr	565	570	575	
ttc cca atg agc cag agt agt ttc aca gta ggt gct gat act ttt agt				1776
Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser	580	585	590	
tca ggg aat gaa gtt tat ata gac aga ttt gaa ttg att cca gtt act				1824
Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr	595	600	605	
gca aca ttt gaa gca gaa tat gat tta gaa aga gca caa aag gcg gtg				1872
Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val	610	615	620	
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg				1920
Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val	625	630	635	640
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca				1968
Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser	645	650	655	
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa				2016
Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys	660	665	670	
cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac				2064
His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn	675	680	685	
ttc aaa ggc atc aat agg caa cta gac cgt ggt tgg aga gga agt acg				2112
Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr	690	695	700	

gat att acc atc caa aga gga gat gac gta ttc aaa gaa aat tat gtc	2160
Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val	
705 710 715 720	
aca cta cca ggt acc ttt gat gag tgc tat cca aca tat ttg tat caa	2208
Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln	
725 730 735	
aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga	2256
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg	
740 745 750	
ggg tat atc gaa gat agt caa gac tta gaa atc tat tta att cgc tac	2304
Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr	
755 760 765	
aat gca aaa cat gaa aca gta aat gtg cca ggt acg ggt tcc tta tgg	2352
Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp	
770 775 780	
ccg ctt tca gcc caa agt cca atc gga aag tgt gga gag ccg aat cga	2400
Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg	
785 790 795 800	
tgc gcg cca cac ctt gaa tgg aat cct gac tta gat tgt tcg tgt agg	2448
Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg	
805 810 815	
gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att	2496
Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile	
820 825 830	
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc	2544
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile	
835 840 845	
ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag	2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu	
850 855 860	
ttt ctc gaa gag aaa cca tta gta gga gaa gcg cta gct cgt gtg aaa	2640
Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys	
865 870 875 880	
aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa	2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu	
885 890 895	
aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt	2736
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe	
900 905 910	
gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg	2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met	
915 920 925	
att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg	2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu	

930	935	940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa			2880
Pro Glu Leu Ser Val Ile	Pro Gly Val Asn Ala	Ala Ile Phe Glu Glu	
945	950	955 960	
tta gaa ggg cgt att ttc act gca ttc tcc cta tat gat gcg aga aat			2928
Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn			
965	970	975	
gtc att aaa aat ggt gat ttt aat aat ggc tta tcc tgc tgg aac gtg			2976
Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val			
980	985	990	
aaa ggg cat gta gat gta gaa gaa caa aac aac caa cgt tcg gtc ctt			3024
Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu			
995	1000	1005	
gtt gtt ccg gaa tgg gaa gca gaa gtg tca caa gaa gtt cgt gtc			3069
Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val			
1010	1015	1020	
tgt ccg ggt cgt ggc tat atc ctt cgt gtc aca gcg tac aag gag			3114
Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu			
1025	1030	1035	
gga tat gga gaa ggt tgc gta acc att cat gag atc gag aac aat			3159
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn			
1040	1045	1050	
aca gac gaa ctg aag ttt agc aac tgc gta gaa gag gaa atc tat			3204
Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr			
1055	1060	1065	
cca aat aac acg gta acg tgt aat gat tat act gta aat caa gaa			3249
Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu			
1070	1075	1080	
gaa tac gga ggt gcg tac act tct cgt aat cga gga tat aac gaa			3294
Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu			
1085	1090	1095	
gct cct tcc gta cca gct gat tat gcg tca gtc tat gaa gaa aaa			3339
Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys			
1100	1105	1110	
tcg tat aca gat gga cga aga gag aat cct tgt gaa ttt aac aga			3384
Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg			
1115	1120	1125	
ggg tat agg gat tac acg cca cta cca gtt ggt tat gtg aca aaa			3429
Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys			
1130	1135	1140	
gaa tta gaa tac ttc cca gaa acc gat aag gta tgg att gag att			3474
Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile			
1145	1150	1155	

gga gaa acg gaa gga aca ttt atc gtg gac agc gtg gaa tta ctc 3519
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 1160 1165 1170

ctt atg gag gaa tag 3534
 Leu Met Glu Glu
 1175

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 <212> PRT
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 <223> Hybrid Delta-Endotoxin

<400> 26

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 20 25 30
 Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
 35 40 45
 Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
 50 55 60
 Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
 65 70 75 80
 Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
 85 90 95
 Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
 100 105 110
 Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
 115 120 125
 Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
 130 135 140
 Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val
 145 150 155 160
 Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser
 165 170 175
 Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg
 180 185 190
 Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp His Ala Val
 195 200 205

Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg
 210 215 220
 Asp Trp Ile Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val
 225 230 235 240
 Leu Asp Ile Val Ser Leu Phe Pro Asn Tyr Asp Ser Arg Thr Tyr Pro
 245 250 255
 Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val
 260 265 270
 Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu
 275 280 285
 Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr
 290 295 300
 Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Trp Ser Gly His Gln
 305 310 315 320
 Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro
 325 330 335
 Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala
 340 345 350
 Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg
 355 360 365
 Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp
 370 375 380
 Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val
 385 390 395 400
 Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln
 405 410 415
 Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His
 420 425 430
 Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile
 435 440 445
 Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn
 450 455 460
 Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His
 465 470 475 480
 Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly
 485 490 495
 Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile
 500 505 510
 Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg

515					520					525					
Tyr	Ala	Ser	Thr	Thr	Asn	Leu	Arg	Ile	Tyr	Val	Thr	Val	Ala	Gly	Glu
530						535					540				
Arg	Ile	Phe	Ala	Gly	Gln	Phe	Asn	Lys	Thr	Met	Asp	Thr	Gly	Asp	Pro
545					550					555					560
Leu	Thr	Phe	Gln	Ser	Phe	Ser	Tyr	Ala	Thr	Ile	Asn	Thr	Ala	Phe	Thr
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Phe	Pro	Met	Ser	Gln	Ser	Ser	Phe	Thr	Val	Gly	Ala	Asp	Thr	Phe	Ser
			580					585					590		
Ser	Gly	Asn	Glu	Val	Tyr	Ile	Asp	Arg	Phe	Glu	Leu	Ile	Pro	Val	Thr
		595					600					605			
Ala	Thr	Phe	Glu	Ala	Glu	Tyr	Asp	Leu	Glu	Arg	Ala	Gln	Lys	Ala	Val
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Asn	Ala	Leu	Phe	Thr	Ser	Ile	Asn	Gln	Ile	Gly	Ile	Lys	Thr	Asp	Val
625					630					635					640
Thr	Asp	Tyr	His	Ile	Asp	Gln	Val	Ser	Asn	Leu	Val	Asp	Cys	Leu	Ser
				645					650					655	
Asp	Glu	Phe	Cys	Leu	Asp	Glu	Lys	Arg	Glu	Leu	Ser	Glu	Lys	Val	Lys
			660					665					670		
His	Ala	Lys	Arg	Leu	Ser	Asp	Glu	Arg	Asn	Leu	Leu	Gln	Asp	Pro	Asn
		675					680					685			
Phe	Lys	Gly	Ile	Asn	Arg	Gln	Leu	Asp	Arg	Gly	Trp	Arg	Gly	Ser	Thr
	690					695					700				
Asp	Ile	Thr	Ile	Gln	Arg	Gly	Asp	Asp	Val	Phe	Lys	Glu	Asn	Tyr	Val
705					710					715					720
Thr	Leu	Pro	Gly	Thr	Phe	Asp	Glu	Cys	Tyr	Pro	Thr	Tyr	Leu	Tyr	Gln
				725					730					735	
Lys	Ile	Asp	Glu	Ser	Lys	Leu	Lys	Ala	Phe	Thr	Arg	Tyr	Gln	Leu	Arg
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Asp	Gly	Glu	Lys	Cys	Ala	His	His	Ser	His	His	Phe	Ser	Leu	Asp	Ile
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Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile
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Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu
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Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met
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Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu
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Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu
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Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn
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Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val
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Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu
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Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu
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Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly
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tac acc cca atc gat att tcc ttg tgc cta acg caa ttt ctt ttg agt 144
Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
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Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
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tgg gga att ttt ggt ccc tct caa tgg gac gca ttt ctt gta caa att 240
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
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Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
85 90 95

att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa 336
Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
100 105 110

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Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
115 120 125

gag atg cgt att caa ttc aat gac atg aac agt gcc ctt aca acc gct	432
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala	
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Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val	
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Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser	
165 170 175	
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Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg	
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Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val	
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Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg	
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Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val	
225 230 235 240	
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Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro	
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Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val	
260 265 270	
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Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu	
275 280 285	
aga agt att agg agt cca cat ttg atg gat ata ctt aac agt ata acc	912
Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr	
290 295 300	
atc tat acg gat gct cat agg ggt tat tat tat tgg tca ggg cat caa	960
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln	
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Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro	
325 330 335	
cta tat gga act atg gga aat gca gct cca caa caa cgt att gtt gct	1056
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala	
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Gln	Leu	Gly	Gln	Gly	Val	Tyr	Arg	Thr	Leu	Ser	Ser	Thr	Leu	Tyr	Arg		
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aga	cct	ttt	aat	ata	ggg	ata	aat	aat	caa	caa	cta	tct	gtt	ctt	gac	1152	
Arg	Pro	Phe	Asn	Ile	Gly	Ile	Asn	Asn	Gln	Gln	Leu	Ser	Val	Leu	Asp		
		370				375					380						
ggg	aca	gaa	ttt	gct	tat	gga	acc	tcc	tca	aat	ttg	cca	tcc	gct	gta	1200	
Gly	Thr	Glu	Phe	Ala	Tyr	Gly	Thr	Ser	Ser	Asn	Leu	Pro	Ser	Ala	Val		
		385			390					395					400		
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Tyr	Arg	Lys	Ser	Gly	Thr	Val	Asp	Ser	Leu	Asp	Glu	Ile	Pro	Pro	Gln		
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Asn	Asn	Asn	Val	Pro	Pro	Arg	Gln	Gly	Phe	Ser	His	Arg	Leu	Ser	His		
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Val	Ser	Met	Phe	Arg	Ser	Gly	Phe	Ser	Asn	Ser	Ser	Val	Ser	Ile	Ile		
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aga	gct	cct	atg	ttc	tct	tgg	ata	cat	cgt	agt	gct	gaa	ttt	aat	aat	1392	
Arg	Ala	Pro	Met	Phe	Ser	Trp	Ile	His	Arg	Ser	Ala	Glu	Phe	Asn	Asn		
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ata	att	gca	tcg	gat	agt	att	act	caa	ata	cca	ttg	gta	aaa	gca	cat	1440	
Ile	Ile	Ala	Ser	Asp	Ser	Ile	Thr	Gln	Ile	Pro	Leu	Val	Lys	Ala	His		
		465				470				475					480		
aca	ctt	cag	tca	ggt	act	act	gtt	gta	aga	ggg	ccc	ggg	ttt	acg	gga	1488	
Thr	Leu	Gln	Ser	Gly	Thr	Thr	Val	Val	Arg	Gly	Pro	Gly	Phe	Thr	Gly		
				485					490					495			
gga	gat	att	ctt	cga	cga	aca	agt	gga	gga	cca	ttt	gct	tat	act	att	1536	
Gly	Asp	Ile	Leu	Arg	Arg	Thr	Ser	Gly	Gly	Pro	Phe	Ala	Tyr	Thr	Ile		
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gtt	aat	ata	aat	ggg	caa	tta	ccc	caa	agg	tat	cgt	gca	aga	ata	cgc	1584	
Val	Asn	Ile	Asn	Gly	Gln	Leu	Pro	Gln	Arg	Tyr	Arg	Ala	Arg	Ile	Arg		
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tat	gcc	tct	act	aca	aat	cta	aga	att	tac	gta	acg	gtt	gca	ggt	gaa	1632	
Tyr	Ala	Ser	Thr	Thr	Asn	Leu	Arg	Ile	Tyr	Val	Thr	Val	Ala	Gly	Glu		
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cgg	att	ttt	gct	ggt	caa	ttt	aac	aaa	aca	atg	gat	acc	ggt	gac	cca	1680	
Arg	Ile	Phe	Ala	Gly	Gln	Phe	Asn	Lys	Thr	Met	Asp	Thr	Gly	Asp	Pro		
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tta	aca	ttc	caa	tct	ttt	agt	tac	gca	act	att	aat	aca	gct	ttt	aca	1728	
Leu	Thr	Phe	Gln	Ser	Phe	Ser	Tyr	Ala	Thr	Ile	Asn	Thr	Ala	Phe	Thr		
				565				570						575			
ttc	cca	atg	agc	cag	agt	agt	ttc	aca	gta	ggt	gct	gat	act	ttt	agt	1776	
Phe	Pro	Met	Ser	Gln	Ser	Ser	Phe	Thr	Val	Gly	Ala	Asp	Thr	Phe	Ser		
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Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr	
595 600 605	
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Ala Thr Phe Glu Ala Glu Tyr Asp Leu Glu Arg Ala Gln Lys Ala Val	
610 615 620	
aat gcg ctg ttt act tct ata aac caa ata ggg ata aaa aca gat gtg	1920
Asn Ala Leu Phe Thr Ser Ile Asn Gln Ile Gly Ile Lys Thr Asp Val	
625 630 635 640	
acg gat tat cat att gat caa gta tcc aat tta gtg gat tgt tta tca	1968
Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser	
645 650 655	
gat gaa ttt tgt ctg gat gaa aag cga gaa ttg tcc gag aaa gtc aaa	2016
Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys	
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cat gcg aag cga ctc agt gat gag cgg aat tta ctt caa gat cca aac	2064
His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn	
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Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr	
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Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val	
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Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln	
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aaa atc gat gaa tca aaa tta aaa gcc ttt acc cgt tat caa tta aga	2256
Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg	
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Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr	
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Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp	
770 775 780	
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Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg	
785 790 795 800	
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Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg	
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gat gga gaa aag tgt gcc cat cat tcg cat cat ttc tcc tta gac att	2496

Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile	
820 825 830	
gat gta gga tgt aca gac tta aat gag gac cta ggt gta tgg gtg atc	2544
Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile	
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ttt aag att aag acg caa gat ggg cac gca aga cta ggg aat cta gag	2592
Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu	
850 855 860	
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Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys	
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aga gcg gag aaa aaa tgg aga gac aaa cgt gaa aaa ttg gaa tgg gaa	2688
Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu	
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aca aat atc gtt tat aaa gag gca aaa gaa tct gta gat gct tta ttt	2736
Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe	
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gta aac tct caa tat gat caa tta caa gcg gat acg aat att gcc atg	2784
Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met	
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att cat gcg gca gat aaa cgt gtt cat agc att cga gaa gct tat ctg	2832
Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu	
930 935 940	
cct gag ctg tct gtg att ccg ggt gtc aat gcg gct att ttt gaa gaa	2880
Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu	
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Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn	
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Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val	
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Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu	
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Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu	
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Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu		
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Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu		
	115	120 125
Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala		
	130	135 140
Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val		
145	150	155 160
Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser		
	165	170 175
Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg		
	180	185 190
Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val		
	195	200 205
Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg		
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Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val		
225	230	235 240
Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro		
	245	250 255
Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val		
	260	265 270
Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu		
	275	280 285
Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr		
	290	295 300
Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln		
305	310	315 320
Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro		
	325	330 335
Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala		
	340	345 350
Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg		
	355	360 365

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Gly	Thr	Glu	Phe	Ala	Tyr	Gly	Thr	Ser	Ser	Asn	Leu	Pro	Ser	Ala	Val	385	390	395	400
Tyr	Arg	Lys	Ser	Gly	Thr	Val	Asp	Ser	Leu	Asp	Glu	Ile	Pro	Pro	Gln	405	410	415	
Asn	Asn	Asn	Val	Pro	Pro	Arg	Gln	Gly	Phe	Ser	His	Arg	Leu	Ser	His	420	425	430	
Val	Ser	Met	Phe	Arg	Ser	Gly	Phe	Ser	Asn	Ser	Ser	Val	Ser	Ile	Ile	435	440	445	
Arg	Ala	Pro	Met	Phe	Ser	Trp	Ile	His	Arg	Ser	Ala	Glu	Phe	Asn	Asn	450	455	460	
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Thr	Leu	Gln	Ser	Gly	Thr	Thr	Val	Val	Arg	Gly	Pro	Gly	Phe	Thr	Gly	485	490	495	
Gly	Asp	Ile	Leu	Arg	Arg	Thr	Ser	Gly	Gly	Pro	Phe	Ala	Tyr	Thr	Ile	500	505	510	
Val	Asn	Ile	Asn	Gly	Gln	Leu	Pro	Gln	Arg	Tyr	Arg	Ala	Arg	Ile	Arg	515	520	525	
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Leu	Thr	Phe	Gln	Ser	Phe	Ser	Tyr	Ala	Thr	Ile	Asn	Thr	Ala	Phe	Thr	565	570	575	
Phe	Pro	Met	Ser	Gln	Ser	Ser	Phe	Thr	Val	Gly	Ala	Asp	Thr	Phe	Ser	580	585	590	
Ser	Gly	Asn	Glu	Val	Tyr	Ile	Asp	Arg	Phe	Glu	Leu	Ile	Pro	Val	Thr	595	600	605	
Ala	Thr	Phe	Glu	Ala	Glu	Tyr	Asp	Leu	Glu	Arg	Ala	Gln	Lys	Ala	Val	610	615	620	
Asn	Ala	Leu	Phe	Thr	Ser	Ile	Asn	Gln	Ile	Gly	Ile	Lys	Thr	Asp	Val	625	630	635	640
Thr	Asp	Tyr	His	Ile	Asp	Gln	Val	Ser	Asn	Leu	Val	Asp	Cys	Leu	Ser	645	650	655	
Asp	Glu	Phe	Cys	Leu	Asp	Glu	Lys	Arg	Glu	Leu	Ser	Glu	Lys	Val	Lys	660	665	670	

His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn
 675 680 685
 Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr
 690 695 700
 Asp Ile Thr Ile Gln Arg Gly Asp Asp Val Phe Lys Glu Asn Tyr Val
 705 710 715 720
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 Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg
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 Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr
 755 760 765
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 Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg
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 820 825 830
 Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile
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 Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu
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 Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu
 945 950 955 960
 Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn
 965 970 975
 Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val

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Lys	Gly	His	Val	Asp	Val	Glu	Glu	Gln	Asn	Asn	Gln	Arg	Ser	Val	Leu
995					1000					1005					
Val	Val	Pro	Glu	Trp	Glu	Ala	Glu	Val	Ser	Gln	Glu	Val	Arg	Val	
1010					1015					1020					
Cys	Pro	Gly	Arg	Gly	Tyr	Ile	Leu	Arg	Val	Thr	Ala	Tyr	Lys	Glu	
1025					1030					1035					
Gly	Tyr	Gly	Glu	Gly	Cys	Val	Thr	Ile	His	Glu	Ile	Glu	Asn	Asn	
1040					1045					1050					
Thr	Asp	Glu	Leu	Lys	Phe	Ser	Asn	Cys	Val	Glu	Glu	Glu	Ile	Tyr	
1055					1060					1065					
Pro	Asn	Asn	Thr	Val	Thr	Cys	Asn	Asp	Tyr	Thr	Val	Asn	Gln	Glu	
1070					1075					1080					
Glu	Tyr	Gly	Gly	Ala	Tyr	Thr	Ser	Arg	Asn	Arg	Gly	Tyr	Asn	Glu	
1085					1090					1095					
Ala	Pro	Ser	Val	Pro	Ala	Asp	Tyr	Ala	Ser	Val	Tyr	Glu	Glu	Lys	
1100					1105					1110					
Ser	Tyr	Thr	Asp	Gly	Arg	Arg	Glu	Asn	Pro	Cys	Glu	Phe	Asn	Arg	
1115					1120					1125					
Gly	Tyr	Arg	Asp	Tyr	Thr	Pro	Leu	Pro	Val	Gly	Tyr	Val	Thr	Lys	
1130					1135					1140					
Glu	Leu	Glu	Tyr	Phe	Pro	Glu	Thr	Asp	Lys	Val	Trp	Ile	Glu	Ile	
1145					1150					1155					
Gly	Glu	Thr	Glu	Gly	Thr	Phe	Ile	Val	Asp	Ser	Val	Glu	Leu	Leu	
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Leu	Met	Glu	Glu												
1175															

<210> 29
 <211> 3579
 <212> DNA
 <213> Artificial

<220>
 <223> Hybrid Delta-Endotoxin

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tcgctaacgc aatttcctttt gagtgaattt gttcccggtg ctggatttgt gttaggacta	180
gttgatataa tatggggaat ttttggtccc tctcaatggg acgcatttct tgtacaaatt	240

gaacagttaa ttaaccaaag aatagaagaa ttcgctagga accaagccat ttctagatta	300
gaaggactaa gcaatcttta tcaaatttac gcagaatctt ttagagagtg ggaagcagat	360
cctactaatc cagcattaag agaagagatg cgtattcaat tcaatgacat gaacagtgcc	420
cttacaaccg ctattcctct ttttgcagtt caaaattatc aagttcctct tttatcagta	480
tatgttcaag ctgcaaattt acatttatca gttttgagag atgtttcagt gtttggacaa	540
aggtggggat ttgatgccgc gactatcaat agtcgttata atgatttaac taggcttatt	600
ggcaactata cagattatgc tgtacgctgg tacaatacgg gattagaacg tgtatgggga	660
ccggattcta gagattgggt aagggtataat caatttagaa gagaattaac actaactgta	720
ttagatatcg ttgctctgtt cccgaattat gatagtagaa gatatccaat tcgaacagtt	780
tcccaattaa caagagaaat ttatacaaac ccagtattag aaaattttga tggtagtttt	840
cgaggctcgg ctcagggcat agaaagaagt attaggagtc cacatttgat ggatatactt	900
aacagtataa ccatctatac ggatgctcat aggggttatt attattggtc agggcatcaa	960
ataatggctt ctctgttagg gttttcgggg ccagaattca cttttccgct atatggaact	1020
atgggaaatg cagctccaca acaacgtatt gttgctcaac taggtcaggg cgtgtataga	1080
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agtaatagta gtgtaagtat aataagagct cctatgttct cttggataca tcgtagtgca	1380
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ttcagagggga tcaatagaca accagaccgt ggctggagag gaagtacaga tattaccatc	2160
caaggaggag atgacgtatt caaagagaat tacgtcacac taccgggtac cgttgatgag	2220
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ttcaagatta agacgcaaga tggccatgca agactagga atctagagtt tctcgaagag	2640
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tgctggaacg tgaaaggtca tgtagatgta gaagagcaaa acaaccaccg ttcggtcctt	3060
gttatcccag aatgggaggc agaagtgtca caagaggttc gtgtctgtcc aggtcgtggc	3120
tatatccttc gtgtcacagc atataaagag ggatatggag agggctgcgt aacgatccat	3180
gagatcgaag acaatacaga cgaactgaaa ttcagcaact gtgtagaaga ggaagtatat	3240
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gaatctaaca gaggctatgg ggattacaca ccaactaccg ctggttatgt aacaaaggat	3480
ttagagtact tcccagagac cgataaggta tggattgaga tcggagaaac agaaggaaca	3540
ttcatcgtgg atagcgtgga attactcctt atggaggaa	3579

<210> 30

<211> 1193

<212> PRT
<213> Artificial

<220>

<223> Hybrid Delta-Endotoxin

<400> 30

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20 25 30

Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser
35 40 45

Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile
50 55 60

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile
65 70 75 80

Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala
85 90 95

Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu
100 105 110

Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu
115 120 125

Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala
130 135 140

Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val
145 150 155 160

Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser
165 170 175

Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg
180 185 190

Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val
195 200 205

Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg
210 215 220

Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val
225 230 235 240

Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro
245 250 255

Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val
260 265 270

Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu
 275 280 285
 Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr
 290 295 300
 Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln
 305 310 315 320
 Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro
 325 330 335
 Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala
 340 345 350
 Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg
 355 360 365
 Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp
 370 375 380
 Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val
 385 390 395 400
 Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln
 405 410 415
 Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His
 420 425 430
 Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile
 435 440 445
 Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Thr Leu Thr Asn
 450 455 460
 Thr Ile Asp Pro Glu Arg Ile Asn Gln Ile Pro Leu Val Lys Gly Phe
 465 470 475 480
 Arg Val Trp Gly Gly Thr Ser Val Ile Thr Gly Pro Gly Phe Thr Gly
 485 490 495
 Gly Asp Ile Leu Arg Arg Asn Thr Phe Gly Asp Phe Val Ser Leu Gln
 500 505 510
 Val Asn Ile Asn Ser Pro Ile Thr Gln Arg Tyr Arg Leu Arg Phe Arg
 515 520 525
 Tyr Ala Ser Ser Arg Asp Ala Arg Val Ile Val Leu Thr Gly Ala Ala
 530 535 540
 Ser Thr Gly Val Gly Gly Gln Val Ser Val Asn Met Pro Leu Gln Lys
 545 550 555 560
 Thr Met Glu Ile Gly Glu Asn Leu Thr Ser Arg Thr Phe Arg Tyr Thr
 565 570 575

Asp Phe Ser Asn Pro Phe Ser Phe Arg Ala Asn Pro Asp Ile Ile Gly
 580 585 590
 Ile Ser Glu Gln Pro Leu Phe Gly Ala Gly Ser Ile Ser Ser Gly Glu
 595 600 605
 Leu Tyr Ile Asp Lys Ile Glu Ile Ile Leu Ala Asp Ala Thr Phe Glu
 610 615 620
 Ala Glu Ser Asp Leu Glu Arg Ala Gln Lys Ala Val Asn Ala Leu Phe
 625 630 635 640
 Thr Ser Ser Asn Gln Ile Gly Leu Lys Thr Asp Val Thr Asp Tyr His
 645 650 655
 Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser Asp Glu Phe Cys
 660 665 670
 Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys His Ala Lys Arg
 675 680 685
 Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Arg Gly Ile
 690 695 700
 Asn Arg Gln Pro Asp Arg Gly Trp Arg Gly Ser Thr Asp Ile Thr Ile
 705 710 715 720
 Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val Thr Leu Pro Gly
 725 730 735
 Thr Val Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu
 740 745 750
 Ser Lys Leu Lys Ala Tyr Thr Arg Tyr Glu Leu Arg Gly Tyr Ile Glu
 755 760 765
 Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala Lys His
 770 775 780
 Glu Ile Val Asn Val Pro Gly Thr Gly Ser Leu Trp Pro Leu Ser Ala
 785 790 795 800
 Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg Cys Ala Pro His
 805 810 815
 Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly Glu Lys
 820 825 830
 Cys Ala His His Ser His His Phe Thr Leu Asp Ile Asp Val Gly Cys
 835 840 845
 Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile Phe Lys Ile Lys
 850 855 860
 Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu Phe Leu Glu Glu
 865 870 875 880
 Lys Pro Leu Leu Gly Glu Ala Leu Ala Arg Val Lys Arg Ala Glu Lys

885	890	895
Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Asn Ile Val 900 905 910		
Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe Val Asn Ser Gln 915 920 925		
Tyr Asp Arg Leu Gln Val Asp Thr Asn Ile Ala Met Ile His Ala Ala 930 935 940		
Asp Lys Arg Val His Arg Ile Arg Glu Ala Tyr Leu Pro Glu Leu Ser 945 950 955 960		
Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu Leu Glu Gly Arg 965 970 975		
Ile Phe Thr Ala Tyr Ser Leu Tyr Asp Ala Arg Asn Val Ile Lys Asn 980 985 990		
Gly Asp Phe Asn Asn Gly Leu Leu Cys Trp Asn Val Lys Gly His Val 995 1000 1005		
Asp Val Glu Glu Gln Asn Asn His Arg Ser Val Leu Val Ile Pro 1010 1015 1020		
Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val Cys Pro Gly 1025 1030 1035		
Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu Gly Tyr Gly 1040 1045 1050		
Glu Gly Cys Val Thr Ile His Glu Ile Glu Asp Asn Thr Asp Glu 1055 1060 1065		
Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Val Tyr Pro Asn Asn 1070 1075 1080		
Thr Val Thr Cys Asn Asn Tyr Thr Gly Thr Gln Glu Glu Tyr Glu 1085 1090 1095		
Gly Thr Tyr Thr Ser Arg Asn Gln Gly Tyr Asp Glu Ala Tyr Gly 1100 1105 1110		
Asn Asn Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu 1115 1120 1125		
Lys Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Ser Asn 1130 1135 1140		
Arg Gly Tyr Gly Asp Tyr Thr Pro Leu Pro Ala Gly Tyr Val Thr 1145 1150 1155		
Lys Asp Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu 1160 1165 1170		
Ile Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu 1175 1180 1185		

Leu Leu Met Glu Glu
1190

<210> 31
<211> 16
<212> DNA
<213> Artificial

<220>
<223> Synthetic Oligonucleotide

<400> 31
cgttgctctg ttcccg 16

<210> 32
<211> 20
<212> DNA
<213> Artificial

<220>
<223> Synthetic Oligonucleotide

<400> 32
tcaaatacca ttggtaaaag 20

<210> 33
<211> 3534
<212> DNA
<213> Artificial

<220>
<223> Hybrid Delta-Endotoxin

<400> 33
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gttgatataa tatggggaat ttttggtccc tctcaatggg acgcatttct tgtacaaatt 240
gaacagttaa ttaaccaaag aatagaagaa ttcgctagga accaagccat ttctagatta 300
gaaggactaa gcaatcttta tcaaatttac gcagaatctt ttagagagtg ggaagcagat 360
cctactaatc cagcattaag agaagagatg cgtattcaat tcaatgacat gaacagtgcc 420
cttacaaccg ctattcctct ttttgcagtt caaaattatc aagttcctct tttatcagta 480
tatgttcaag ctgcaaattt acatttatca gttttgagag atgtttcagt gtttggacaa 540
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ggcaactata cagattatgc tgtacgctgg tacaatacgg gattagaacg tgtatgggga	660
ccggattcta gagattgggt aagggtataat caatttagaa gagaattaac actaactgta	720
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ttagaaatct atttaattcg ctacaatgca aaacatgaaa cagtaaagt gccaggtagc	2340

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 gtgacaaaag aattagaata cttcccagaa accgataagg tatggattga gattggagaa 3480
 acggaaggaa catttatcgt ggacagcgtg gaattactcc ttatggagga atag 3534

<210> 34
 <211> 1177
 <212> PRT
 <213> Artificial

<220>
 <223> Hybrid Delta-Endotoxin

<400> 34

Met	Asp	Asn	Asn	Pro	Asn	Ile	Asn	Glu	Cys	Ile	Pro	Tyr	Asn	Cys	Leu
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Ser	Asn	Pro	Glu	Val	Glu	Val	Leu	Gly	Gly	Glu	Arg	Ile	Glu	Thr	Gly
			20					25					30		
Tyr	Thr	Pro	Ile	Asp	Ile	Ser	Leu	Ser	Leu	Thr	Gln	Phe	Leu	Leu	Ser

35					40					45					
Glu	Phe	Val	Pro	Gly	Ala	Gly	Phe	Val	Leu	Gly	Leu	Val	Asp	Ile	Ile
50						55					60				
Trp	Gly	Ile	Phe	Gly	Pro	Ser	Gln	Trp	Asp	Ala	Phe	Leu	Val	Gln	Ile
65					70					75					80
Glu	Gln	Leu	Ile	Asn	Gln	Arg	Ile	Glu	Glu	Phe	Ala	Arg	Asn	Gln	Ala
				85					90					95	
Ile	Ser	Arg	Leu	Glu	Gly	Leu	Ser	Asn	Leu	Tyr	Gln	Ile	Tyr	Ala	Glu
			100					105					110		
Ser	Phe	Arg	Glu	Trp	Glu	Ala	Asp	Pro	Thr	Asn	Pro	Ala	Leu	Arg	Glu
			115				120					125			
Glu	Met	Arg	Ile	Gln	Phe	Asn	Asp	Met	Asn	Ser	Ala	Leu	Thr	Thr	Ala
	130					135					140				
Ile	Pro	Leu	Phe	Ala	Val	Gln	Asn	Tyr	Gln	Val	Pro	Leu	Leu	Ser	Val
145						150					155				160
Tyr	Val	Gln	Ala	Ala	Asn	Leu	His	Leu	Ser	Val	Leu	Arg	Asp	Val	Ser
				165					170					175	
Val	Phe	Gly	Gln	Arg	Trp	Gly	Phe	Asp	Ala	Ala	Thr	Ile	Asn	Ser	Arg
			180					185					190		
Tyr	Asn	Asp	Leu	Thr	Arg	Leu	Ile	Gly	Asn	Tyr	Thr	Asp	Tyr	Ala	Val
	195					200						205			
Arg	Trp	Tyr	Asn	Thr	Gly	Leu	Glu	Arg	Val	Trp	Gly	Pro	Asp	Ser	Arg
	210					215					220				
Asp	Trp	Val	Arg	Tyr	Asn	Gln	Phe	Arg	Arg	Glu	Leu	Thr	Leu	Thr	Val
225						230					235				240
Leu	Asp	Ile	Val	Ala	Leu	Phe	Pro	Asn	Tyr	Asp	Ser	Arg	Arg	Tyr	Pro
				245					250					255	
Ile	Arg	Thr	Val	Ser	Gln	Leu	Thr	Arg	Glu	Ile	Tyr	Thr	Asn	Pro	Val
			260					265					270		
Leu	Glu	Asn	Phe	Asp	Gly	Ser	Phe	Arg	Gly	Ser	Ala	Gln	Gly	Ile	Glu
		275					280					285			
Arg	Ser	Ile	Arg	Ser	Pro	His	Leu	Met	Asp	Ile	Leu	Asn	Ser	Ile	Thr
	290					295					300				
Ile	Tyr	Thr	Asp	Ala	His	Arg	Gly	Tyr	Tyr	Tyr	Trp	Ser	Gly	His	Gln
305						310					315				320
Ile	Met	Ala	Ser	Pro	Val	Gly	Phe	Ser	Gly	Pro	Glu	Phe	Thr	Phe	Pro
				325					330					335	
Leu	Tyr	Gly	Thr	Met	Gly	Asn	Ala	Ala	Pro	Gln	Gln	Arg	Ile	Val	Ala
			340					345					350		

Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg
 355 360 365
 Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp
 370 375 380
 Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val
 385 390 395 400
 Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln
 405 410 415
 Asn Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His
 420 425 430
 Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile
 435 440 445
 Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Glu Phe Asn Asn
 450 455 460
 Ile Ile Ala Ser Asp Ser Ile Thr Gln Ile Pro Leu Val Lys Ala His
 465 470 475 480
 Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly
 485 490 495
 Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile
 500 505 510
 Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg
 515 520 525
 Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu
 530 535 540
 Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro
 545 550 555 560
 Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr
 565 570 575
 Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser
 580 585 590
 Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr
 595 600 605
 Ala Thr Leu Glu Ala Glu Tyr Asn Leu Glu Arg Ala Gln Lys Ala Val
 610 615 620
 Asn Ala Leu Phe Thr Ser Thr Asn Gln Leu Gly Leu Lys Thr Asn Val
 625 630 635 640
 Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Thr Tyr Leu Ser
 645 650 655

Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys
 660 665 670
 His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Ser Asn
 675 680 685
 Phe Lys Asp Ile Asn Arg Gln Pro Glu Arg Gly Trp Gly Gly Ser Thr
 690 695 700
 Gly Ile Thr Ile Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val
 705 710 715 720
 Thr Leu Ser Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln
 725 730 735
 Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg
 740 745 750
 Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr
 755 760 765
 Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp
 770 775 780
 Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg
 785 790 795 800
 Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg
 805 810 815
 Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile
 820 825 830
 Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile
 835 840 845
 Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu
 850 855 860
 Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys
 865 870 875 880
 Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu
 885 890 895
 Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe
 900 905 910
 Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met
 915 920 925
 Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu
 930 935 940
 Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu
 945 950 955 960
 Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn

